

GOLF CLUB HEAD WITH SHAFT LOCATING DEVICE

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15 **FIELD OF THE INVENTION**

[001] The present invention relates to an improved connection of a golf club shaft to the head of a golf club.

BACKGROUND OF THE INVENTION

[002] A key facet in manufacturing or assembling golf clubs is the head-to-shaft attachment. Because of the generally high mechanical stress which can occur at this interface, the connection between the two components needs to be sufficiently strong to withstand a golfer's swing, the impact of a golf ball, as well as the club impacting the ground. Generally, prior art golf clubs are assembled by affixing the outer surface of one end of a golf club shaft, via the use of an adhesive, such as an epoxy, to the inner surface of a bore either in the club head or in the interior portion of a hosel extending from the club head. In order to ensure that there is adequate space between the shaft and the bore hole for an adequate quantity of adhesive to bind the surfaces, sufficient space must exist between these surfaces. Due to the space or tolerance between the shaft and the interior surface of the bore hole, there is a gap or room for the golf club shaft to shift and vary in location depending upon the amount of space between the shaft and the bore hole. Indeed, depending upon the amount of tolerance, the end result is that the axis of the golf club shaft, after the adhesive has solidified or otherwise set, can vary by significant amounts. The possibility for such

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variation can result in the golf club shaft not being properly aligned to the golf club head and, accordingly, assembled golf clubs employing the same golf club heads and shafts may vary from club to club. Additionally, such variation in the location of the shaft axis relative to the head of the golf club causes unpredictable variations in lie angle, face angle, and face progression.

5 [003] This problem is also inherent in certain prior art golf clubs which use cast heads, or heads made using other manufacturing techniques, which produce club head bores having inconsistent dimensions, flaws, or dimensional variations which result in the golf club shaft not mating accurately or uniformly with the head of the golf club. Such inconsistencies, flaws, or variations, likewise, result in the axis of golf club shafts in assembled clubs varying from club to club. Furthermore, in addition to the functional disadvantages associated with the prior art methods of assembling shafts to golf club heads, as will be appreciated by those of ordinary skill in the art, as well as golfers generally, if a shaft is not centered within the bore or hosel, the result can be a club having a poor aesthetic appearance.

15 SUMMARY OF THE INVENTION

[004] The present invention overcomes the limitations of the prior art by using a unique and previously unknown shaft locating device for receiving and locating the shaft within the golf club head bore or hosel.

20 [005] A golf club used with the present invention preferably comprises a head having a top side or surface, a bottom side or surface, and a front face wall for impacting a golf ball. The golf club head is also defined as having a heel end and a toe end, the heel end being the end of the golf club which is closest to the golfer when the golf club is at address. The toe end of the golf club is the end of the golf club which is furthest away from the golfer when the golf club is at address:

[006] Golf club heads used with the present invention preferably have a bore hole disposed in or near the heel end of the golf club. The bore hole preferably has an opening in the top side or surface of the golf club and extends into the golf club and towards the bottom side or surface of the golf club. The bore, as will be understood by those of ordinary skill in the art, may extend any number of depths into the golf club head and, indeed, even through the golf club head. Moreover, the location of the bore hole within a golf club may vary. Alternatively, the golf club head may have a hosel, or other extension, extending up from the top side or surface of the golf club head. As will be appreciated, the location of the bore, and whether it is located within the golf club head, outside of the golf club head, both in and outside the golf club head, or otherwise affixed to the golf club head, has no bearing on the operation, scope or teaching of the present invention.

[007] The bore of the golf club head has an inner surface having an upper and a lower end. The upper end of the bore hole preferably has adequate dimensions to receive the shaft locating device of the present invention. The shaft locating device is preferably inserted, or otherwise placed or formed, into the upper end of the bore hole. As will be appreciated by those of ordinary skill in the art, the shaft locating device may be a separate component that is placed into the upper end of the bore hole or, alternatively, formed as an integral component of the golf club or hosel. Further, the shaft locating device may also be located and offset partially into the depth of the bore hole or hosel.

[008] The shaft locating device, if a separate component, preferably has an outer surface that adequately conforms to at least a portion of the inner surface of the upper end of the bore hole. While in one preferred embodiment the present invention has a shaft locating device which is circular in shape, the invention encompasses any embodiments in which the shaft locating device may be affixed to the bore hole or otherwise formed as a component thereof.

[009] The shaft locating device of the present invention preferably has a bore therein, said bore having an axis, through which the end of the shaft which is affixed to the golf club head is inserted. The diameter of the bore in the shaft locating device is preferably either an interference fit with the corresponding diameter, or other shape, of the portion of the shaft which is adjacent thereto when assembled, or of sufficiently close tolerance to preclude the shaft from shifting relative thereto. The bottom, or tip, of the shaft is preferably inserted into the bottom of the bore hole in the golf club head. The bottom of the bore hole in the golf club head preferably has a narrowed portion, cup, socket, or other cavity into which the tip of the shaft is seated. While this element is not essential to the invention, if used, it will provide greater consistency in the uniform location of the shaft, and axis thereof, from assembled golf club to golf club.

[010] The location of the bore in the shaft locating device, after the shaft is placed therein, preferably locates the shaft in a preferred and consistent location. As will be appreciated, if the tip of the shaft is placed or seated in a narrowed portion, cup, socket, or other cavity in the bottom of the bore hole in the club head, as is taught in one embodiment of the present invention, the location and axis of the shaft relative to the golf club head will be fixed and, indeed, repeatable from golf club to golf club. While the use of the shaft locating device of the present invention alone will substantially improve and increase the accuracy and consistency in club head and shaft assembly and orientation, the use of a narrowed portion, cup, socket, or other cavity to seat the tip of the shaft in the bottom of the bore hole, will further improve the accuracy and consistency of the present invention.

[011] As will be understood by those of ordinary skill in the art, in addition to providing a means to center the location of a shaft, the present invention may also be employed to, preferably, locate a shaft at preferred locations within the parameters of a bore hole. Thus, if a golfer,

assembler, or manufacturer would prefer to locate a shaft off-center, consistently, the present invention may be used for such purposes as well.

[012] The present invention is a new, unique and useful apparatus and method for more accurately and consistently locating a shaft within a golf club head bore or hosel. The present invention also provides a more aesthetically pleasing and consistent appearance between the golf club head and shaft. The present invention also permits the use of shafts of varying outer diameters, and even dimensions, in a golf club head or hosel without varying the diameter of the club head bore. Additional advantages of the present invention are described herein and others will be apparent and obvious to those of ordinary skill in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

[013] FIGURE 1 is a cross-sectional view of a portion of the front of a golf club of one embodiment according to the present invention;

[014] FIGURE 2 is a cross-sectional view of a portion of the front of a golf club of one embodiment of the present invention, without a shaft connected to the head of the golf club;

[015] FIGURE 3 is cross-sectional view of an unassembled portion of the front of a golf club, one embodiment of the shaft locating device of the present invention, and a portion of a shaft;

[016] FIGURE 4 is a cross-sectional view of one embodiment of the shaft locating device according to the present invention;

[017] FIGURE 5 is a cross-sectional front view of another embodiment of the shaft locating device, according to the present invention;

[018] FIGURE 6 is a top view of the shaft locating device shown in Figure 5.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

[019] Referring to Figures 1-3, a golf club, such as an iron, comprises a head 10 having a bore 12, and a shaft 14. The head 10 of the present invention may be of any suitable configuration, including a conventional configuration with a heel end 16 and toe end (not shown), and encompasses any type of golf club including, for example, what have conventionally been referred to as irons, woods, putters, wedges, and the like. The club head 10 is preferably cast from suitable metal, such as titanium or stainless steel, but other materials and manufacturing methods as are known to those of ordinary skill in the art, such as forging, wood fabrication, composite materials, as well as any new materials may be used. The head 10 preferably has a top side or top surface 18, a bottom side or bottom surface 20, and a front face wall 22 for impacting a golf ball. The front face wall 22 conventionally extends between the heel end 16 and toe end along a frontal portion of the head 10. A bore 12 is preferably positioned near the heel end 16 of the head extending from the top surface 18 of the club 10 down toward the bottom surface 20 of the club head 10. As will be appreciated by those of ordinary skill in the art, the location of the bore 12 may vary from club to club, or club design to club design. Additionally, the golf club head 10 may, or may not, have a hosel 24, or other extension, extending up from the heel end 16 or top surface 18 of the golf club head 10. As will be appreciated, the location of the bore 12, and whether it is located within the golf club head 10, outside of the golf club head 10, both in and outside the golf club head 10, or otherwise affixed to the golf club head 10, has no bearing on the operation, scope or teaching of the present invention.

[020] The bore 12 may extend any number of depths into the golf club head 10, even through the golf club head 10, or any variation of depth into a hosel 24. Moreover, the location of the bore 12 within a golf club head 10 may vary. As shown in Figures 1-3, the golf club head may

have a hosel 24, or other extension, extending up from the top surface 18 of the golf club head 10 which has a bore 12 therein. Alternatively, with certain club heads, particularly drivers, the upper end 26 of the bore 12 may be substantially flush with the top surface 18 of the head 10, or have a portion extending up from the top surface 18 to, generally, entirely or partially receive a shaft 14.

5 [021] The bore 12 of the present invention preferably has an inner surface 28 having a upper end 26 and a bottom end 30. A shaft locating device 32 is preferably formed of a material such as plastic or a soft metal, such as brass or aluminum. The shaft locating device 32 preferably has an outer peripheral surface 34. At least a portion of the outer peripheral surface 34 of the shaft locating device 32 is, in one embodiment, inserted, or otherwise placed or formed, into the upper
10 end 26 of the bore 12 of the club head 10. As shown in Figures 1-3, in one embodiment, the portion of the shaft locating device 32 that is inserted into the upper end 26 of the bore 12 is preferably seated in a groove or counterbore 36 that surrounds the upper end 26 of the bore 12. In another embodiment, the shaft locating device 32 is inserted into a bore 12 that has a uniform inner diameter and lacks a groove 36.

15 [022] The shaft locating device 32 of the present invention, if a separate component, preferably has an outer peripheral surface 34 that generally conforms to the shape of at least a portion of the inner surface 28 of the bore 12. In one preferred embodiment, at least a portion of the outer peripheral surface 34 of the shaft locating device 32 is secured in the inner surface of the upper end 26 of the bore 12 of the club head 10. As will be appreciated by those of ordinary skill in
20 the art, any number of products or methods may be used to secure the shaft locating device 32 within the upper end 26 of the bore 12, including, for example, adhesives, pins, keys, and interlocking mechanisms. Alternatively, the outer peripheral surface 34 of the shaft locating device 32 can form an interference fit with the corresponding upper end 26 of the bore 12 when assembled,

or of sufficiently close tolerance to preclude the shaft locating device 32 from shifting relative thereto.

[023] While in one preferred embodiment, as shown in Figures 1 and 3, the present invention has a shaft locating device 32 that has a circular cross-sectional shape, the present invention is not so limited. Rather, the peripheral shape of the shaft locating device 32 of the present invention may take any shape or form. The shaft locating device 32 preferably has a bore 38 extending therethrough. The shape of the bore 38 through the shaft locating device 32 is not limited to having a uniform diameter, rather, the bore 38 will preferably have a shape which closely approximates the shape of the corresponding portion of the shaft 14 which will be positioned in the shaft locating device 32 when the golf club is assembled. The shaft 14 may be made of any materials known to those in the art including, for example, steel or graphite composite.

[024] The shaft locating device 32 of the present invention is also not limited to being a separate component which is assembled in the bore 12 of the club head 10. The present invention encompasses, among other embodiments, embodiments in which the shaft locating device 32 may be formed or fabricated as an integral component of the golf club head 10 or hosel 24.

[025] In one preferred embodiment, when assembled, as shown in Figure 1, the shaft locating device 32 includes an upper portion 40 that extends upwardly from the club head 10 and a lower portion 42 that is inserted into the bore 12. As will be appreciated by those of ordinary skill in the art, if present, the upper portion 40 of the shaft locating device 32 can provide a more aesthetically pleasing and consistent transition between the golf club head 10 and shaft 14. In another embodiment, the entire shaft locating device 32 is inserted into the bore 12, with the upper portion 40 remaining flush with the upper end of the bore 12 and no upper portion 40 extending out of the head 10 of the golf club. Alternatively, the shaft locating device can be placed entirely within

the bore 12 so that the upper portion 40 is also located completely within the bore 12, but not flush with the top surface 18 of the club head 10.

[026] The bottom end 30 of the bore 12 preferably has a narrowed portion 44, or a cup, socket, or other cavity into which the bottom end 46 of the shaft 14 is seated. The narrowed
5 portion 44, along with the shaft locating device 32, serves to align the shaft 14 in the bore 12, and, by relationship, the club head 10. While the narrowed portion 44 is not essential to the invention, if used, it will provide greater consistency in the uniform location of the shaft 14, and axis thereof, from assembled golf club to golf club.

[027] As illustrated in Fig. 1, the bottom end 46 of the shaft 14 is preferably inserted into
10 the bottom end 30 of the bore 12. The portion of the shaft 14 that extends into the bore 12 can, in yet another embodiment, preferably be affixed to the bore 12 or golf club by using methods known in the art, such as, for example, adhesives, screws, or other fastening methods or devices.

[028] As discussed herein, the shaft locating device 32 of the present invention preferably has a passageway or bore 38 therein, said bore 38 has an axis, through which the bottom end 46 of
15 the shaft 14 is inserted. The diameter or other shape of the bore 38 in the shaft locating device 32 is preferably either an interference fit with the corresponding diameter or shape of the portion of the shaft 14 which is adjacent thereto when assembled, or of sufficiently close tolerance to preclude the shaft 14 from shifting relative thereto. The location of the bore 38 in the shaft locating device 32 locates the shaft 14 in a preferred and consistent location. The close tolerance or interference fit
20 between the bore 38 of the shaft locating device 32 and the portion of the shaft 14 that is adjacent thereto eliminates or significantly reduces shifting and variations in alignment of the shaft 14 within the bore 12 as occurs in prior art golf clubs.

[029] The many aspects and benefits of the invention are apparent from the detailed description, and thus, it is intended for the following claims to cover all such aspects and benefits of

the invention which fall within the scope and spirit of the invention. In addition, because numerous modifications and variations will readily occur to those skilled in the art, the claims should not be construed to limit the invention to the exact construction and operation illustrated and described herein. Accordingly, all suitable modifications and equivalents should be understood to fall within

5 the scope of the invention as claimed herein.